Appendix S4 – Health system framework factors affected by the COVID-19 pandemic by World Bank income group

Number of patients affected by treatment type and World Bank income group		Changes to treatment due to the COVID-19 pandemic
Low-income countries	Chemotherapy (n = 4)	- Cancelled (n = 2) - Delayed (n = 2) - Shorter duration of treatment (n = 1) - Change in route of administration of chemotherapy agent (n = 1)
	Radiotherapy (n = 0)	NA
	Immunotherapy (n = 0)	NA
	Surgery (n = 1)	- Operation performed in an alternative hospital (n = 1)
Lower-middle income countries	Chemotherapy (n = 141)	- Cancelled (n = 8) - Delayed (n = 93) - Reduction in dose (n = 7) - Increase in dose (n = 4) - Reduction in the number of cycles (n = 7) - Increase in the number of cycles (n = 8) - Shorter duration of treatment (n = 5) - Longer duration of treatment (n = 19) - Change in choice of agent (n = 21) - Change in route of administration of chemotherapy agent (n = 7) - Change to/addition of an alternative anti-cancer treatment modality (n = 5)
	Radiotherapy (n = 32)	- Cancelled (n = 3) - Delayed (n = 25) - Change in modality (n = 3) - Change to/addition of an alternative anti-cancer treatment modality (n = 2)
	Immunotherapy (n = 1)	- Delayed (n = 1)
	Surgery (n = 63)	- No longer offered (n = 1) - Abandoned (n = 2) - Delayed (n = 45) - Change in choice of operation (n = 8) - Operation performed in an alternative hospital (n = 6) - Underwent neoadjuvant therapy where this would not typically have been indicated (n = 2) - No neoadjuvant therapy given, where this would typically have been indicated (n = 2) - Underwent a longer or more intensive course of neoadjuvant therapy that would have typically been indicated (n = 6) - Underwent a shorter or less intensive course of neoadjuvant therapy that would have typically been indicated (n = 1) - No adjuvant therapy, where this would typically have been indicated (n = 1) - Changed to active palliative care (n = 2)
Upper-middle income countries	Chemotherapy (n = 44)	- Cancelled (n = 8) - Delayed (n = 25) - Reduction in dose (n = 3) - Change in choice of agent (n = 9)

		- Change to/addition of an alternative anti-cancer treatment modality (n = 1)
	Radiotherapy (n = 0)	NA
	Immunotherapy (n = 1)	- Delayed (n = 1)
	Surgery (n = 20)	- Delayed (n = 17) - Change in choice of operation (n = 1) - Operation performed in an alternative hospital (n = 2)
High income countries	Chemotherapy (n = 23)	- Delayed (n = 17) - Reduction in dose (n = 2) - Increase in the number of cycles (n = 1) - Shorter duration of treatment (n = 1) - Change in choice of agent (n = 1) - Change to/addition of an alternative anti-cancer treatment modality (n = 2)
	Radiotherapy (n = 10)	- Delayed (n = 9) - Change in modality (n = 1)
	Immunotherapy (n = 3)	- Delayed (n = 3)
	Surgery (n = 14)	- Delayed (n = 12) - Change in choice of operation (n = 1) - Operation performed in an alternative hospital (n = 1) - Underwent a longer or more intensive course of neoadjuvant therapy that would have typically been indicated (n = 1)
		Reasons for changes to treatment due to the COVID-19 pandemic
Low-income countries	Chemotherapy	Decision making (n = 1) - Change in treatment as per local MDT / hospital policy (n = 1) Infrastructure (n = 2) - Lockdown/Travel restrictions prevent access to treatment (n = 2) - Lack of hospital inpatient beds (infrastructure) (n = 2) Workforce (n = 1) - Insufficient staff due to redeployment/restructuring (n = 1)
	Radiotherapy	NA
	Immunotherapy	NA
	Surgery	Service delivery (n = 1) - Transfer to a different institution for treatment (n = 1)
Lower-middle income countries	Chemotherapy	Decision making (n = 55) - Change in treatment as per local MDT / hospital policy (n = 24) - Change in treatment as per regional policy (n = 1) - Change in treatment as per national policy (n = 9) - Change in treatment plan by lead clinician (n = 28) Infrastructure (n = 74) - Lockdown/Travel restrictions prevent access to treatment (n = 66) - Lack of hospital inpatient beds (infrastructure) (n = 13) - Lack of hospital intensive care beds (n = 2) - Lack of outpatient facilities for support post-discharge (n = 4) - Lack of blood products (n = 3) - Lack of personal protective equipment (n = 6) - Lack of drugs (n = 9) Workforce (n = 18) - Insufficient staff due to redeployment/restructuring (n = 16) - Insufficient staff due to sickness (n = 8) Service delivery (n = 14) - No treatment available due to restructuring of services (n = 5)

	- Transfer to a different institution for treatment (n = 9) Financing (n = 11) - Inability to pay for treatment (n = 7) - Loss of employment by caregiver (n = 5) Patient factors (n = 38) - Patient/patient's family chooses to avoid treatment during the pandemic (n = 33) - Treatment not possible as caregiver infected with SARS-CoV-2 and under mandatory isolation (n = 3) - Treatment not possible as patient infected with SARS-CoV-2 and under mandatory isolation (n = 2) Other factors (n = 7)
Radiotherapy	Decision making (n = 10) - Change in treatment as per local MDT / hospital policy (n = 4) - Change in treatment as per national policy (n = 2) - Change in treatment plan by lead clinician (n = 4) Infrastructure (n = 20) - Lockdown/Travel restrictions prevent access to treatment (n = 14) - Lack of hospital inpatient beds (infrastructure) (n = 4) - Lack of outpatient facilities for support post-discharge (n = 2) - Lack of personal protective equipment (n = 1) - Lack of equipment (n = 1) Workforce (n = 9) - Insufficient staff due to redeployment/restructuring (n = 9) - Insufficient staff due to sickness (n = 6) Service delivery (n = 10) - No treatment available due to restructuring of services (n = 8) - Transfer to a different institution for treatment (n = 2) Financing (n = 6) - Inability to pay for treatment (n = 5) - Loss of employment by caregiver (n = 1) Patient factors (n = 8) - Patient/patient's family chooses to avoid treatment during the pandemic (n = 6) - Treatment not possible as patient infected with SARS-CoV-2 and under mandatory isolation (n = 2) Other factors (n = 1)
Immunotherapy	Infrastructure (n = 1) - Lack of outpatient facilities for support post-discharge (n = 1)
Surgery	Decision making (n = 19) - Change in treatment as per local MDT / hospital policy (n = 12) - Change in treatment as per regional policy (n = 1) - Change in treatment plan by lead clinician (n = 7) Infrastructure (n = 37) - Lockdown/Travel restrictions prevent access to treatment (n = 27) - Lack of hospital inpatient beds (infrastructure) (n = 9) - Lack of hospital intensive care beds (n = 13) - Lack of outpatient facilities for support post-discharge (n = 1) - Lack of blood products (n = 1) - Lack of personal protective equipment (n = 3) - Lack of equipment (n = 2) - Lack of drugs (n = 1) Workforce (n = 8) - Insufficient staff due to redeployment/restructuring (n = 8) - Insufficient staff due to sickness (n = 6) Service delivery (n = 15)

		- No treatment available due to restructuring of services (n = 9) - Transfer to a different institution for treatment (n = 7) Financing (n = 3) - Inability to pay for treatment (n = 2) - Loss of employment by caregiver (n = 1) Patient factors (n = 10) - Patient/patient's family chooses to avoid treatment during the pandemic (n = 9) - Treatment not possible as caregiver infected with SARS-CoV-2 and under mandatory isolation (n = 1) Other factors (n = 7)
Upper-middle income countries	Chemotherapy	Decision making (n = 36) - Change in treatment as per local MDT / hospital policy (n = 31) - Change in treatment as per regional policy (n = 2) - Change in treatment as per national policy (n = 1) - Change in treatment plan by lead clinician (n = 7) Infrastructure (n = 3) - Lockdown/Travel restrictions prevent access to treatment (n = 2) - Lack of hospital inpatient beds (infrastructure) (n = 1) Service delivery (n = 3) - No treatment available due to restructuring of services (n = 2) - Transfer to a different institution for treatment (n = 1) Patient factors (n = 2) - Patient/patient's family chooses to avoid treatment during the pandemic (n = 2)
	Radiotherapy	NA
	Immunotherapy	Data not available (n = 1)
	Surgery	Decision making (n = 13) - Change in treatment as per local MDT / hospital policy (n = 11) - Change in treatment plan by lead clinician (n = 2) Infrastructure (n = 15) - Lockdown/Travel restrictions prevent access to treatment (n = 15) Workforce (n = 3) - Insufficient staff due to redeployment/restructuring (n = 3) Service delivery (n = 3) - No treatment available due to restructuring of services (n = 1) - Transfer to a different institution for treatment (n = 2)
High income countries	Chemotherapy	Decision making (n = 12) - Change in treatment as per local MDT / hospital policy (n = 4) - Change in treatment as per regional policy (n = 1) - Change in treatment plan by lead clinician (n = 7) Infrastructure (n = 5) - Lockdown/Travel restrictions prevent access to treatment (n = 1) - Lack of hospital inpatient beds (infrastructure) (n = 3) - Lack of outpatient facilities for support post-discharge (n = 1) - Lack of drugs (n = 1) Workforce (n = 1) - Insufficient staff due to sickness (n = 1) Service delivery (n = 2) - Transfer to a different institution for treatment (n = 2) Patient factors (n = 8) - Patient/patient's family chooses to avoid treatment during the pandemic (n = 1) - Treatment not possible as caregiver infected with SARS-CoV-2 and under mandatory isolation (n = 1)

	- Treatment not possible as patient infected with SARS-CoV-2 and under mandatory isolation (n = 3) - Treatment not possible as patient and caregiver under mandatory isolation, but not infected with SARS-CoV-2 (n = 3) Other factors (n = 2)
Radiotherapy	Decision making (n = 5) - Change in treatment as per regional policy (n = 2) - Change in treatment plan by lead clinician (n = 3) Infrastructure (n = 2) - Lockdown/Travel restrictions prevent access to treatment (n = 2) Service delivery (n = 3) - No treatment available due to restructuring of services (n = 1) - Transfer to a different institution for treatment (n = 2) Patient factors (n = 2) - Patient/patient's family chooses to avoid treatment during the pandemic (n = 1) - Treatment not possible as patient infected with SARS-CoV-2 and under mandatory isolation (n = 1) Other factors (n = 1)
Immunotherapy	Decision making (n = 2) - Change in treatment as per local MDT / hospital policy (n = 1) - Change in treatment plan by lead clinician (n = 1) Patient factors (n = 1) - Patient/patient's family chooses to avoid treatment during the pandemic (n = 1)
Surgery	Decision making (n = 7) - Change in treatment as per local MDT / hospital policy (n = 3) - Change in treatment as per regional policy (n = 2) - Change in treatment as per national policy (n = 1) - Change in treatment plan by lead clinician (n = 1) Infrastructure (n = 4) - Lockdown/Travel restrictions prevent access to treatment (n = 3) - Lack of hospital intensive care beds (n = 1) Service delivery (n = 4) - Transfer to a different institution for treatment (n = 4) Financing (n = 2) - Inability to pay for treatment (n = 2) Patient factors (n = 2) - Patient/patient's family chooses to avoid treatment during the pandemic (n = 1) - Treatment not possible as caregiver infected with SARS-CoV-2 and under mandatory isolation (n = 1)